Is Corruption Detrimental to International Trade?

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Abstract

Many regard corruption to be detrimental to international trade. Some, however, think that corruption greases commerce in case of low-quality institutions. Others argue that arbitrary corruption is more damaging to trade than predictable corruption. This is the first paper to test these hypotheses empirically with trade-related measures of corruption. It finds that in general, corruption is detrimental to international trade. However, bribe paying may be beneficial in countries with very long waiting-times at the border or low-quality customs. Moreover, the nature of corruption matters: more uncertainty in advance about the bribe to be paid reduces trade.

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'If I am born again, I want to come back as a customs official.'

Anonymous Thai Businessman[1]

I. INTRODUCTION

The New Institutional Economics has once again drawn the attention to the important role formal and informal institutions play in the functioning of an economy. The formal institutions consist of legally enforceable rules like laws. They provide the legal framework within which economic agents operate. However, the favourable influence of a legal system on economic activity will only materialize if it is properly enforced and embedded in informal institutions: habits, unwritten rules of good conduct and the enforcement of law.[2] In this context, corruption - defined as the misuse of public power for private benefit - refers to a state in which the informal institutions are in a very bad shape. Consequently, one would expect that countries characterized by a high level of corruption perform badly in many respects. Several empirical studies confirm that corruption is bad for economic growth (Mauro, 1995; Méndez & Sepúlveda, 2001; Campos, Lien & Pradhan, 1999), the inflow of foreign direct investment (Wei, 1997), and that it delays trade reform (Azfar and Lee, 2001).

Various channels explain these detrimental effects of corruption. Firstly, corruption has a *psychocentric* effect; the government neglects alternative options based on realistic and rational grounds (Alatas, 1990, p. 128, p. 130). Secondly, the potentially most productive individuals will divert their talent to rent-seeking instead of useful productive activities. Thirdly, speed money evolves into necessary payments and then into extortionary fees, resulting in inefficiency (Klitgaard, 1988). Corruption often increases inefficiency (the amount of *red tape*) and consequently it is sand rather than grease (Bardhan, 1997, pp. 1322-1323). Fourthly, firms with the right political connections (and thus those that are trusted by officials not to betray them) receive contracts. They are *not necessarily* the most efficient

[1] Quote taken from Gatti (1999).

[2] See Hodgson (forthcoming) for a discussion on the difference between formal and informal rules. The definitions given in the text closely resemble those given by North in a letter to Hodgson (see the Appendix of Hodgson, forthcoming). North doesn't explicitly take into account that the degree of enforcement can differ with respect to norms that in principle can be enforced legally. Here we regard the enforcement as part of the informal institutions.

(Murphy, Shleifer & Vishny, 1991). Finally, high bidding is often the result of low (and thus cheap) quality levels.[3]

In contrast to the literature cited above some authors argue that in certain (second-best) cases, corruption can have a positive influence; it 'greases the wheels of commerce.' Lui (1985) shows that if bribery is allowed, *speed money* allows clients to avoid bureaucratic delays, and it can minimise waiting costs if clients have different opportunity costs of time. Another argument is that corruption allows supply and demand to operate efficiently, because under competitive bidding for government contracts, the most efficient firms can offer the highest bribes. Thus, the contract goes to the lowest-cost firm (Beck and Maher, 1986; Kaufmann, 1997; Lien, 1986). Without bribe paying, a less efficient firm may have been chosen (perhaps because of its familiarity). If, in this second-best world, there are pre-existing policy induced distortions, the additional distortions caused by corruption may well improve welfare (Leff, 1964, p. 11; Huntington, 1968, p. 386). To sum up, 'bribes are viewed not only as reasonable but as enhancing efficiency in situations where *red tape*[4] or state control of the economy may be strangling economic activity' (Elliot, 1997, p. 186, emphasis added).

A limitation of this positive view on corruption is that it is based on various forms of second best worlds, so that it does not deliver guidelines for the best policies to follow. Another problem with this view is that it disregards enforceability problems. Because of the illegal nature of corrupt deals, a briber cannot go to court and demand compliance to the contract by the bribee. Due to this arbitrariness, bribees may renege on the understanding with the briber and demand additional payments (Bardhan, 1997, p. 1324; Boyco, Shleifer & Vishny, 1995). The screening of potential partners to check whether they can be trusted becomes necessary. Search costs are very high, as open advertising for trustworthy partners is not possible (Lambsdorff, 2002). Even after screening, the security of transactions is limited. A briber will have to keep a firm eye on the bribee to see if he sticks to the deal. This leads up to substantial negotiation and monitoring costs. Even after a corrupt transaction is over, partners are 'locked in' to each other and they must fear being denounced or being forced to pay hush money (Lambsdorff, 2002).

[3] An example often presented is that of road building. The maintenance of roads is expensive. Road-building firms that cut down on the necessary repairs can still win the contract if they offer bribes to the right officials. Consequently, an increase in corruption often results in a lower quality of the infrastructure.

[4] Often, an enormous quantity of rules written down is seen as red tape. However, red tape embraces that those regulations are (at least threatened to be) enforced.

The nature of corruption can also influence the effect of corruption (Herrera & Rodriguez, 2003). It is important to make a distinction between well-organised and chaotic or arbitrary corruption (Mauro, 1998; Myint, 2000; Shleifer & Vishny, 1993). If corruption is organised (or collusive), it is predictable. Businesspersons know in advance the size of bribes, who to bribe, and the service delivered to them. In contrast, in a chaotic, unorganised system of corruption, all is uncertain. Officials (operating on their own 'islands') do not know what others charge, leading to overcharging. The amount of bribe money necessary and the delivery of service by the official are uncertain to the briber. Traders who deal with least developed countries are in fact often uncertain about what to expect when dealing with customs (see Cunningham (1996), quoted by Finger and Schuler (1999, p. 7). They will thus have to take additional measures such as taking a lot of cash money with them (in case they have to bribe many officials), devoting a lot of time to negotiations on the conditions of the illicit deal, and keeping a firm eye on the settlement of the deal. This of course is costly. Risk-averse businesspersons may consequently choose not to do business at all in a country with such a system.

Summing up, in general corruption is regarded to be detrimental to economic performance. However, it could have positive effects in countries in which the formal and informal institutions are relatively bad. Then, bribes might serve as 'lubricants' in an otherwise sluggish economy. Moreover, the degree of predictability of corruption influences its effects. The more predictable the amounts to be paid and the services provided, the less detrimental the effects of corruption. Whether these hypotheses are true or not is an empirical issue, which this paper addresses. In particular, it investigates the influence of corruption on bilateral trade flows. The effects of corruption on trade flows are less widely investigated than those of corruption on growth. Moreover, recently a set of relatively good indicators of the quality of customs have become available, enabling us to proxy directly the degree of corruption at the border instead of relying on measures of corruption in general.

Two papers provide some empirical analysis relevant for this question. The first is by Lambsdorff (1999). He claims that exports of some countries are *positively associated* with corruption levels in importing countries, in the sense that their market shares are higher in countries that are more corrupt. However, since Lambsdorff uses market shares in stead of trade flows, this result does *not necessarily* mean that these countries export more (in absolute levels) when corruption is higher, it could also be that the drop in their exports as a result of corruption is lower than the decline in exports from (most of) the other countries in Lambsdorff's analysis. The second study is by De Groot et al. (2004) and investigates the

relationship between institutional qualities in general and trade, but not specifically at corruption, and certainly not at the sort of corruption that is directly relevant for trade, i.e. corruption in the customs service. In this paper, we seek to fill this gap and to provide evidence on the relationship between corruption and international trade.

The setup of the paper is as follows. In the next section, we discuss corruption and its sources. Section 3 presents the data and the empirical analysis, whereas Section 4 gives some concluding remarks.

II. CORRUPTION AND ITS CAUSES

The most commonly used definition of corruption is 'the misuse of public power for private benefit' (or much alike). Public power is exercised by bureaucrats (in the context of international trade: customs officials) and by politicians. Misuse would be deviating from formal duties of a public role or not living up to informal rules (e.g. codes of conduct). In general, it amounts to following narrow interests at the expense of those of the general public (Lambsdorff, forthcoming). Clearly, this definition is not entirely satisfying, because what is considered the misuse of public power and thus corruption is subject to debate and may vary across cultures. But this argument should not be taken too far, as there is great consensus across cultures on the moral values concerning corrupt behaviour and the ambiguity only occurs at the 'edge' of a concept (i.e., the 'core' has a universal meaning). Indeed, 'no concept in the social sciences can be defined so precisely as to cover all possible variations' (Alatas, 1990, p. 109). Moreover, 'it is often the Westerner with ethnocentric prejudice, who supposes that a modern Asian or African society does not regard the act of bribery as shameful in the way Westerners regard it' (Noonan, 1984, p. 702).

In the context of international trade, corruption would most often take the form of bribery (as opposed to several other forms of corruption like embezzlement or fraud, which are not very relevant in such a context). Customs officials might misuse their public power for private benefit. Corrupt officials extract bribes from a client, who otherwise will not receive certain services, or will receive worse service. Bribes[5] can be defined as 'transaction[s] that provide the parties involved with undue payment (interpreted widely to include any property having financial and non-financial value) or other benefit or advantage' (UNCTAD, 2001). In

[5] Other known terms include 'kickback,' 'pay-off,' '*baksheesh*,' 'sweetener,' or euphemistic terms such as 'commission' and 'speed money.'

this context, the definition of Lambsdorff (2002) is also useful; corruption is 'an illegal exchange between two partners, one side [the *briber*] paying a bribe, the other [the *bribee*] providing a corrupt service.'[6] Naturally, there are some exchanges that are corrupt in a moral sense, but that are not illegal (or not prosecuted). But the difference between 'moral' and 'legal' definitions of corruption is not very large (Noonan, 1984, p. 702).

What causes corruption? Four reasons for corruption are found in the literature. Firstly, liberal economists argue that the amount of intervention by the state in the form of regulations and restrictions matters (Bardhan, 1997; Mauro, 1998). These regulations may be unfavourable for businesses/traders, for instance because they require a lot of time or prevent access to profitable markets. Public officials that carry out such regulations have a *monopoly* in granting permissions, for instance for importing goods. If regulations reduce profit for traders, they might offer graft to get around them. In this case, customs officials can earn *rents* by deviating from standard procedures (Myint, 2000). Economic rents (or monopoly profits) arise when a person has something unique or special in his possession and is thus able to charge a greater than normal price for its use. The size of the rent is determined by the next best thing such a person can do.

This brings us to the second reason for corruption. For the customs official, accepting the bribe (rent-seeking) may even be necessary because his wage is too low to feed his family. Tanzi (1998) terms this 'corruption due to need.'

Especially sociologists point at another cause, namely differing norms between societies. They would lead to varying levels of corruption across nations. Public officials in some cultures may not carry out ordinary duties without extra payments, which would be considered bribing in other cultures.[7] Furthermore, the level of corruption can be path-dependent, leading to different stable equilibrium levels of corruption (Bardhan, 1997; Chakrabarti, 2001; Mauro, 1998). If everyone is corrupt, it pays to be dishonest as well. If everybody else is honest, behaving truthful offers the highest returns. If 'in the beginning' most people are venal, it is likely that this situation is perpetuated because of natural increasing returns to rent-seeking (Andvig & Moene, 1990; Murphy, Shleifer & Vishny, 1993).

[6] The client is certainly not always a victim of the official, rather they might collude, or the client himself is very active in offering bribes to get certain benefits (e.g. an import licence the briber is not entitled to).

[7] However, Alatas (1990) argues that these norms are not societal (e.g. supported by most of the people) but rather the norms of the *homo venalis* in power (and thus having much influence).

Finally, corruption is influenced by the discretionary powers granted to officials (Myint, 2000). Such powers are particularly strong if government regulations are vague, non-transparent, cumbersome, and large in number. In addition, the less customs officials are held *accountable* for their actions (e.g. monitored by integer supervisors or stigmatised by the public), the better opportunities for demanding bribes are. To conclude, the level of corruption will rise with discretion and decrease with accountability (*ceteris paribus* applies to all effects above).

III. THE EMPIRICAL ANALYSIS

1. The setup of the empirical tests

As far as we know, all empirical studies on the relationship between international trade and the quality of institutions use the gravity model. In order to be able to compare our results with those found by others, we use the gravity model in this study as well. It is very successful in explaining bilateral trade flows, despite the fact that its theoretical underpinning has long been a problem. The Heckscher-Ohlin and Ricardian frameworks are less adequate as theoretical foundations. It is true that, amongst others, Deardoff (1998) shows that the Heckscher-Ohlin could provide a theoretical basis for the gravity model of bilateral trade, but the linking is complicated and perhaps far-stretched. The link with the new trade theory on the other hand is very direct (Mathur, 2000). According to this theory, consumers have a love for variety, and the number of varieties is positively related to a country's GDP. Consequently, the more similar the countries are in their GDP, the larger is the volume of bilateral trade.

2. Data used

An extensive description of the data and its sources is provided in Appendix B. Appendix A contains a list of countries included in the sample. Here we give a brief description of the data only. The dependent variable consists of the logarithm of bilateral exports of total commodities for 2002.

The independent variables are divided into three groups. All observations are for 2002, unless stated otherwise in Appendix B. The first group consists of the variables that are in the basic gravity equation. They are Gross Domestic Product in the importing country and in the

exporting country, Gross Domestic Product per capita in the importing and in the exporting country, and measures of bilateral distance between the two countries concerned.

The second group consists of explanatory variables that do not belong to the basic form of the equation, but are often regarded as important for bilateral trade. Essentially these are dummy variables indicating whether the two countries have a common border, a common language, a common coloniser, or a colonial link. The hypothesis is that bilateral trade is larger between countries that have these common characteristics.

Finally, the third set of variables consists of the variables in which we are interested. They are measures of (a) the intensity of corruption in general, (b) the corruption directly related to international trade, and (c) the unpredictability of corruption. We use three indices for measuring the general level of corruption of a country. The first one is the Corruption Perceptions Index (CPI), issued by Transparency International. It ranges from 0 (highly corrupt) to 10 (almost clean). The other is the scores of countries on the control of corruption index, which ranges from -2.5 to 2.5, with higher values corresponding to better governance. These two measures of the seriousness of corruption in countries are very highly correlated (correlation coefficient of 0.92), indicating that there is great consensus amongst observers about levels of corruption. As we wrote in Section 2, the probability of corruption increases if civil servants have discretionary rights and are not corrected by superiors or independent supervisors. Scores of countries on the following question measure the extent of discretionary policy: 'If a government agent acts against the rules, I can usually go to another official or to his superior and get the correct treatment without recourse to unofficial payments.' Scores range from 1 (always) to 6 (never is there such a possibility).

Three variables measure the extent of corruption and the quality of customs administration. The first one is an indicator for corruption of customs and is the frequency of payments to customs authorities. The scores range from 1 (always) to 6 (never). The other two measure the quality of customs authorities. The first is the numbers of days that it typically takes from the time the goods arrive in their point of entry (e.g. port or airport) until the time a trader can claim them from customs. The scores are in days. The last variable in this group gives an overall picture of the quality and efficiency of services delivered by the customs agency. Scores range from 1 (very good) to 6 (very bad).

As a measure of the unpredictability of corruption, we use an indicator that measures whether businesspeople know in advance about how much 'additional payment' is required (i.e. the amount of money they need to pay). It ranges from 1 (always) to 6 (never). A second indicator included for this purpose measures how often businesspersons need to pay irregular

extra unofficial payments. It also ranges from 1 (always) to 6 (never). Finally, we include the countries' standard deviation of scores on the Corruption Perception Index. It indicates differences in the values of the sources used. The greater the standard deviation is, the greater the differences between sources in perceptions of corruption in a country. In this sense, it might be an indicator for the arbitrariness of corruption.

3. The level of corruption and international trade

Before presenting the regressions, we briefly describe the treatment of missing observations. Unfortunately, the variables measuring the extent and unpredictability of corruption are not available for all countries for which we have date on bilateral trade flows. Reducing the number of observations to the lowest number for which observations are available would result in lower statistical power. In order to avoid this as much as possible, we use the procedure suggested by Cohen and Cohen (1975). The mean of the cases for which there are observations replaces the cases for which observations are lacking. The equations are extended with a dummy. This dummy is equal to one for those cases for which an observation was missing. This procedure does not affect the regression coefficient of the variables based on the cases for which information is present. Yet the cases with missing data contribute to the statistical power of the estimates (see Cohen and Cohen, 1975 for more details).

In accordance with the procedure followed in all studies in this area, we use the gravity equation in the empirical analysis. The typical gravity equation is:

$$\ln(E_{ij}) = \beta_0 + \beta_1 \ln(Y_i) + \beta_2 \ln(Y_j) + \beta_3 \ln(y_i) + \beta_4 \ln(y_j) + \beta_5 (D_{ij}) + \beta_6 Border_{ij} + \beta_7 Comlang_{ij} + \beta_8 Comcol_{ij} + \beta_9 Colony_{ij} + \beta_{10} Inst_i + \varepsilon_{ij} \quad (1)$$

where *i* and *j* denote the importing and exporting country, respectively. E_{ij}, the dependent variable, is total exports from j to i in 2002. The independent variables are, respectively: national income or GDP (Y), national income per capita (y), the distance between i and j (D_{ij}), the dummy variables described above ($Border_{ij}$, $Comlang_{ij}$, $Comcol_{ij}$ and $Colony_{ij}$) and the institutional variable(s) ($Inst_i$), which are the most important for the purpose of this paper. $Inst_i$ differs in successive regressions. The last term, ε_{ij}, is the error term and is assumed to be well-behaved. The relations are estimated by Least Squares where White's procedure is used for deriving heterescedasticity-consistent standard errors.

<insert Table 1>

The first regression is the basic version found in many gravity analyses. It encompasses five predicting variables: the logs of importer's and exporter's GDP (representing market size) and GDP per capita (representing the level of economic development) respectively[8] and the distance between the trading partners. The distance reflects transportation costs and other distance related costs. As can be seen (Table 1, column 1) all independent variables are highly significant with p-values of 0.000. The regression as a whole explains close to 60% of total bilateral exports (the adjusted R^2 is 0.59). All variables have the expected sign; the richer the im- or exporting country, the more trade and the greater the distance between the two countries, the less they trade (generally speaking). The second regression includes several dummy variables that have proven to be effective controls for shared historical, cultural and political background. Again, all variables are significant at the 99% confidence level and have the right signs. Countries with a common background represented by these variables trade more with each other than countries that don't share these characteristics.

The third regression (Table 1, column 3) checks the results by De Groot *et al*. on the impact of corruption in general. In accordance with their findings, a better control of corruption (in both the importing and exporting country) leads to more bilateral trade. Income per capita is no longer significant (importing country) or has the wrong sign (exporting country). This can be attributed to multicollinearity problems; corrupt countries are also poor, see also Lambsdorff (1999), and the correlation between the log of GDP per capita in the importing country and this country's control of corruption is high: 0.83. The control-of-corruption variables become insignificant when we control for the common background, although they keep the right sign (Table 1, column 4). Hence, the results on the influence of corruption in general are not very robust. As a further check on the influence of corruption in general, we run a regression with the log of the CPI (Table 1, last column) as a proxy for corruption. Now the perception of corruption in the importing country is significant but that of the exporting country is not. Hence, based on these results, one cannot state anything with confidence on the effect of corruption in general on bilateral trade. Probably, results that are more conclusive are obtained if one uses variables that measure corruption related to international trade more directly.

[8] We transformed several of the original variables to logs because they were not normally distributed. Failure to do so may lead to false outcomes.

<insert Table 2>

Three variables measure the level of corruption directly related to international trade in the importing country: the frequency of payments, the number of days to import, and an indicator of the quality of customs. The frequency of payments has a significant influence on bilateral trade and has the correct sign (Table 2, column 1).[9] The more often bribes are paid, the lower trade is. In addition, the coefficients of the basic gravity model keep their expected sign and are all highly significant. The average waiting time at the border significantly reduces the volume of trade exported to a country (Table 2, column 2). The other coefficients remain significant. A lower quality of customs significantly reduces inward flows of trade (Table 2, column 3). All other coefficients remain significant. Hence, the results are indeed more robust if one uses measures of corruption directly related to customs.

Since long waiting times and low quality affect trade negatively, will paying bribes change this? In order to test for this, we constructed two interaction variables. If these variables are significant, the effect of waiting times at the border or of quality of the customs depends on bribe paying. Corruption might then improve the situation, in line with the arguments of the proponents of the second view. Corruption may have positive effects, if frequent bribe paying makes the effect of long waiting times or low quality on trade less strong. The first interaction variable is between the frequency of paying bribes and the waiting time at the border.[10] Its coefficient appears to be significant at the ten percent level only and the significance of the other two corruption variables is reduced (Table 2, column 4). Thus, bribe paying does have a weak influence on the relationship between long waiting times and trade. The other interaction variable is the product of the frequency of payments and quality of customs. This variable has no significant impact on trade either (Table 2, column 5); bribe-paying does not reduce the effect of the quality of customs on trade in this sample.[11]

<insert Table 3>

[9] Keep in mind that the higher the score on this variable, the less frequently payments are made. See the Appendix for more details.

[10] The log of (7 - FREQPAY) * NODIMP. This seems complicated, but the calculation is necessary to make interpretations free of problems.

[11] Changing the distance variable (e.g. from DIST to DISTWBIG) does not influence the results substantially.

One could argue that the latter results are found because the sample consists of countries with both (very) good and bad institutions. An argument can be made that bribe-paying greases trade only in those countries that have bad institutions. We therefore make a distinction between countries with bad and those with good institutions. The division is based on the countries' scores on the waiting time at the border and on the quality of customs respectively. Countries are considered to have weak institutions if it takes more than a week (score > 7) on average to import goods, or if the score on the quality of customs is larger than 3.25. No significant results for the corruption variables is found when the quality of customs is used for distinguishing countries with bad and good institutions from each other (Table 3, column 2). The results are markedly different from those of the entire sample when bad institutions are approximated by long waiting times at the border (Table 3, column 1). For the countries with bad institutions, the coefficient of the number of days to import is more than three times as high as the corresponding coefficient for the countries with good institutions. As such, this reduces the volume of trade. However, the highly significant coefficient of the interaction variable between the frequency to pay and the waiting time at the border indicates that bribe paying may 'greases the wheels of commerce'. This result partly contradicts the claims made by Kaufmann and Wei (1999) that paying bribes does not result in faster clearance, but instead may even increase the time spent with bureaucrats. So, although in general corruption increases transaction costs and thus diminishes trade, in countries with bad institutions approximated by very long waiting times at the border, bribe-paying may generate beneficial effects.

4. The nature of corruption and international trade

As has been set out in Section 2, the nature of corruption is potentially important. Its predictability matters for investments (Campos *et al*., 1999), so it is plausible that exporters also care about it. Traders might do less business if they are uncertain about who to bribe (and how often) and the service delivered. To test the influence of uncertainty, we extend the original gravity equation with indicators for the arbitrariness of corruption. The first one measures whether firms know the amount of the payment (bribe) in advance (the more so, the lower the score). This variable has a significant negative coefficient (Table 4, column 1) indicating that more certainty in advance about the bribe to be paid implies more trade.

<insert Table 4>

The second indicator for the predictability of corruption measures the frequency of irregular additional payments. It is low if traders need to make repeated bribes for the same transaction (Lambsdorff, 2001). One would expect that a large number of irregular extra payments would pose severe restrictions to business doing. Surprisingly, this variable has a negative sign (Table 4, column 2), meaning that the less often repeated bribes are required the lower trade is. In other words, it may be so that paying irregular extra bribes *increases* trade. This could be due to the fact that although regular payments do not result in faster access, irregular payments act as speed money because these payments are extra, which may result in more work effort by officials. In their theoretical waiting costs model, Cudmore and Whalley (2003) show that this indeed can occur. After corruption is introduced, queuing costs diminish and exports increase. Thus, it seems that there is evidence for the first view: corruption can be beneficial (it could 'grease the wheels of commerce'). However, is this evidence strong and convincing? Actually, it is not. The reason for this is that irregular additional payments are highly correlated with the certainty in advance about the amount to be paid; the simple correlation coefficient is 0.80. In other words, if one pays many irregular additional payments, the amount to be paid is more certain. Thus, it is likely that the indicator on irregular payments partly 'measures' the sureness of the size of bribes. Consequently, the grease money conclusion is at least questionable.[12]

Another indicator for the arbitrariness of corruption might be the standard deviation of the Corruption Perceptions Index (CPI). This is a valid indicator for the arbitrariness of corruption if the variance of the CPI reflects the uncertainty among respondents about the true spread of bribes. However, this variance might also reflect heterogeneous conditions in a country or judgment difficulties on the side of respondents, so that the results should be interpreted with great care. It does not have any significant influence (Table 4, column 3).

Theoretically, bribery occurs more frequently if businesspersons have lower effective recourse through government channels or managerial superiors (Herrera and Rodriguez, 2003). In order to test this, we included in the regression the degree to which businesspersons say that they have recourse to other officials: so that they may avoid the corrupt. This indicator is significant and has the expected sign, namely negative (Table 4, column 4): if

[12] It would be useful to test for the effects of the quality of the service delivered by customs officials after corrupt deals have been made. The World Business Environment Survey contains this question: 'If a firm pays the required 'additional payment' the service is usually also delivered as agreed.' Useful as this may seem to use in the analysis, there is a major problem. Namely, the effect is necessarily of a second order. First, the client pays a bribe, and then the quality of the service is perceived. The effect of paying a bribe cannot be filtered from the regression results and so these are unreliable. Thus, theoretically it is evident that better service results in more certainty and thus more trade, but this cannot be tested.

recourse to another official is not possible (e.g. the customs official is a monopolist), this will hurt trade.

IV. CONCLUDING REMARKS

This paper shows that more robust results about the effects of corruption on bilateral trade are found if one uses measures of corruption at the border and of the quality of customs instead of corruption in general. The better the quality of the institutions of a country the more it trades with other countries. This result holds for a large group of developed and developing countries. Bribe paying appears to increase inward trade for countries with very bad institutions, indicated by the quality of customs and the number of days imported goods have to wait at the border. In such cases, bribes may serve as 'lubricants' in an otherwise sluggish economy. Finally, we found that trade is reduced the most if corruption is very chaotic, i.e. when traders are not sure about the amount of the bribes necessary and the service provided to them.

A great advantage of our approach is that it uses indicators that measure the relevant items more specific than others do. Nevertheless, some weaknesses also pertain to this study, which may direct future research. First, the analysis is based on official trade statistics, which do not take into account the unofficial or underground economy. As Myint (2000) points out, there can be a lot of illegal and unrecorded trade of goods and services. Corruption directly stimulates the underground economy (Johnson et al., 1998). Thus, the actual amount of trade may be higher than statistics indicate.

Second, a cross-country analysis for one year has at least two limitations: it gives no information on long-term effects or on causality. Azfar and Lee (2001) argue that corruption may lead to many intensive restrictions. Corrupt officials benefit from the imposition of tariffs by extracting bribes, and can influence their governments, so that tariff determination becomes endogenous. Kaufmann (1997, p. 2) points at the enormous degree of discretion many politicians and bureaucrats can have, particularly in corrupt societies. This may lead to a mechanism whereby corruption feeds on itself. Often procedures are designed to maximise the number of steps and approvals to create as many opportunities as possible for negotiation between traders and customs officials. The ultimate goal of these complexities is often to provide a means of augmenting the low salaries of the officials (Myint 2000, p. 53).

Another drawback of cross-country regressions refers to causality. Several authors claim that the causality between corruption and trade runs the *opposite* way. Openness in the form of more imports may also lead to lower corruption. This is because more imports result

in more competition in the product market, thereby reducing available rents and thus bribe-taking (Ades & Di Tella, 1999; Bonaglia, Braga de Macedo & Bussolo, 2001; Larrain & Tavares, 2000; Treisman, 2000; Wei, 2000). But the evidence is not undisputed. Azfar and Knack (2000) show that the results from these authors suffer from sample selection bias; highly corrupt small countries are not in the datasets.[13] Azfar and Knack use other, more reliable (internal World Bank) corruption data, including more countries, to show that there is *no convincing evidence* that greater openness reduces corruption.[14]

These comments suggest at least two ways for future research. The first is to take into account estimates of illegal cross-border transactions. By considering both official trade statistics and illegal transactions, one obtains a better impression of the actual costs of corruption. This might be of great relevance for highly corrupt countries. A second recommendation would be to make use of panel analysis in order to study dynamic effects, provided of course that reliable data are available for several periods and a large number of countries.

[13] The data used in this paper cover a minimum of 58 countries. This minimum is determined by the availability of data on whether additional payments are required. Even the smallest set used contains small, badly governed countries. We, therefore think that thee data do not suffer from selection biases in the way Azfar and Knack describe.

[14] Gray and Sandholtz (2003) also relate import openness to corruption, but they use a composite index of openness (including also investment, travel, and communication measures). Hence, based on their findings, one cannot say much about the separate effect of import openness.

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Appendix A: Countries included

Afghanistan	Djibouti	Lesotho	Sao Tome and Principe
Albania[a,b]	Dominica	Liberia	Saudi Arabia
Algeria	Dominican Republic[a,b]	Libya	Senegal[a,b]
Andorra	East Timor	Liechtenstein	Serbia and Montenegro
Angola[a]	Ecuador[a,b]	Lithuania[a,b]	Seychelles
Antigua and Barbuda	Egypt[a,b]	Luxembourg[a]	Sierra Leone
Argentina[a,b]	El Salvador[a,b]	Macao	Singapore[a,b]
Armenia	Equatorial Guinea	Macedonia	Slovakia[a,b]
Australia[a]	Eritrea	Madagascar[a,b]	Slovenia[a,b]
Austria[a]	Estonia[a,b]	Malawi[a,b]	Somalia
Azerbaijan[a,b]	Ethiopia[a,b]	Malaysia[a,b]	South Africa[a,b]
Bahamas	Fiji	Maldives	South Korea[a]
Bahrain	Finland[a]	Mali	Spain[a,b]
Bangladesh[a,b]	France[a,b]	Malta	Sri Lanka[a]
Barbados	Gabon	Marshall Islands	St. Kitts and Nevis
Belarus[a,b]	Gambia	Martinique	St. Lucia
Belgium[a]	Georgia[a,b]	Mauritania	St. Vincent and the
Belize[b]	Germany[a,b]	Mauritius[a]	Grenadines
Benin	Ghana[a,b]	Mexico[a,b]	Sudan
Bermuda	Greece[a]	Micronesia	Suriname
Bhutan	Grenada	Moldova[b]	Swaziland
Bolivia[a,b]	Guatemala[a,b]	Mongolia	Sweden[a,b]
Bosnia and Herzegovina[b]	Guinea	Morocco[a]	Switzerland[a]
Botswana[a,b]	Guinea-Bissau	Mozambique	Syria
Brazil[a,b]	Guyana	Namibia[a,b]	Tajikistan
Brunei	Haiti[a,b]	Nepal	Tanzania[a,b]
Bulgaria[a,b]	Honduras[a,b]	Netherlands[a]	Thailand[a]
Burkina Faso	Hong Kong[a]	New Zealand[a]	Togo
Burundi	Hungary[a,b]	Nicaragua[a,b]	Tonga
Cambodia[b]	Iceland[a]	Niger	Trinidad and Tobago[a,b]
Cameroon[a,b]	India[a,b]	Nigeria[a,b]	Tunisia[a,b]
Canada[a,b]	Indonesia[a,b]	North Korea	Turkey[a,b]
Cape Verde	Iran	Norway[a]	Turkmenistan
Central African Republic	Iraq	Oman	Uganda[b]
Chad	Ireland[a]	Pakistan[a,b]	Ukraine[a,b]
Chile[a,b]	Israel[a]	Panama[a,b]	United Arab Emirates[a]
China[a]	Italy[a,b]	Papua New Guinea	United Kingdom[a,b]
Colombia[a,b]	Jamaica[a]	Paraguay[a]	United States[a,b]
Comoros	Japan[a]	Peru[a,b]	Uruguay[a,b]
Congo	Jordan[a]	Philippines[a,b]	Uzbekistan[a,b]
Costa Rica[a,b]	Kazakhstan[a,b]	Poland[a,b]	Vanuatu
Cote d'Ivoire[a,b]	Kenya[a,b]	Portugal[a,b]	Venezuela[a,b]
Croatia[a,b]	Kiribati	Puerto Rico	Vietnam[a]
Cuba	Kuwait	Qatar	Yemen
Cyprus	Kyrgyzstan[b]	Romania[a,b]	Zambia[a,b]
Czech Republic[a,b]	Laos	Russia[a,b]	Zimbabwe[a,b]
Dem. Rep. of the Congo	Latvia[a]	Rwanda	
Denmark[a]	Lebanon	Samoa	

For all countries data on bilateral trade and concur are available. For countries indicated by an ‘a’ data on CPI and those indicated by a ‘b’ data on quality of customs are also available.

Appendix B: Data sources

B.1 Basic variables of the gravity model

. Bilateral exports of total commodities for the year 2002. Measured in dollars, Standard International Trade Classification, Revision 1. Source: COMTRADE database, issued by the United Nations Statistics Division.

. importing country's scores on Gross Domestic Product for the year 2002 (2003 was not available yet). Measured in constant 1995 dollars; Source: World Bank, World Development Indicators

. country scores on Gross Domestic Product per capita, idem; Source: idem

. exporting country's scores on Gross Domestic Product, idem; Source: idem

. exporting country's scores on Gross Domestic Product per capita, idem: Source: idem

B.2 Additional variables of gravity model

. the great circle distance between the most important cities or agglomerations (in terms of population) between a pair of countries. Measured in thousands of kilometres; Source *Centre d'Etudes Prospectives et d'Informations Internationales* (CEPII). This data set draws on previous sources developed by Haveman and Henderson.[15]

. the bilateral distance between the two biggest cities of a pair of countries (weighted[16]), idem; Source: idem

. the great circle distance between the capitals of a pair of countries, idem; Source: idem

. Common border: dummy variable, scores are 1 (countries share a common border) or 0 (otherwise); Source: idem

. Common language: dummy variable, scores are 1 (countries share a common language) or 0 (otherwise); Source: idem.

. Common coloniser: dummy variable, scores are 1 (countries have had a common coloniser past 1945) or 0 (otherwise); Source: idem

. Colonial link: dummy variable, scores are 1 (countries have ever had a colonial link) or 0 (otherwise). Source: idem

[15] Specifically, we deleted some countries, and added others. We also adjusted the common language dummy for some countries (e.g. Denmark), because we only wanted matching *first* languages.

[16] See http://www.cepii.fr/anglaisgraph/bdd/distance/noticedist_en.pdf for the methodology and the technical description.

B.3 Measures of corruption

In general

. country scores on the Corruptions Perceptions Index 2002, ranging from 0 (highly corrupt) to 10 (almost clean); Source: Transparency International.[17]

. country scores on control of corruption in the year 2002, ranging from about -2.5 to 2.5, with higher values corresponding to better governance outcomes. Source: The Governance Matters III indicators as published in Kaufmann, Kraay and Mastruzzi (2003) [18]

Corruption at the border

. country scores on *corruption—frequency of payments to customs authorities*, answers to the question: 'Do firms like yours typically need to make extra, unofficial payments to public officials when dealing with customs/imports?' Scores range from 1 (always) to 6 (never) [19]; Source: The World Business Environment Survey (WBES), © The World Bank Group.[20]

. country scores on *number of days to import goods*, answers to the question: 'If you import, how long does it typically take from the time your goods arrive in their point of entry (e.g. port, airport) until the time you can claim them from customs?' Scores are in days[21], Source: idem

. country scores on *quality of customs*, answers to the question: 'Please rate the overall quality and efficiency of services delivered by the following public agencies or services – Customs Service/Agency'. Scores range from 1 (very good) to 6 (very bad); Source: idem.

. country scores on *corruption—known amount of additional payment*, answers to the question: 'Firms in my line of business usually know in advance about how much this 'additional payment' is. This is true…' Scores range from 1 (always) to 6 (never); Source: idem.

[17] On http://www.transparency.org/pressreleases_archive/2002/2002.08.28.cpi.en.html, a detailed description of the methodology can be obtained. We deleted Moldova and Taiwan, because these countries were not available in the UN COMTRADE database (see below).

[18] The data set can be found at http://www.worldbank.org/wbi/governance/govdata2002

[19] All scores with values '0' or greater than 6 were transformed to '6' (i.e. 'never').

[20] Research by Hellman *et al*. (2000) found no systematic biases in the data. The original data set can be obtained at http://www.worldbank.org/privatesector/ic/ic_ica_resources.htm

[21] All scores with the value '97' (days) are missing values and were deleted from the data set.

. country scores on *corruption—common for firms to pay additional payments*, answers to the question: 'It is common for firms in my line of business to have to pay some irregular 'additional payments' to get things done. This is true…'. Scores range from 1 (always) to 6 (never); Source: idem

. country scores on *corruption—recourse to another government official*, answers to the question: 'If a government agent acts against the rules I can usually go to another official or to his superior and get the correct treatment without recourse to unofficial payments. This is true…'. Scores range from 1 (always) to 6 (never). Source: idem.

Statistics of some variables

	Mean	Median	Range	Min	Max
GDP im/exporter	2.0 Bn	8.8 Bn	9.2 Bn	54.6 Mln	9.2 Bn
GDP per capita im/exporter	6,748.0	1,801.0	58,929.1	123.9	59,053.0
Distance	7.88	7.50	19.80	0.01	19.81
Corruption Perceptions Index	4.59	3.80	8.50	1.20	9.70
Frequency of payments	5.22	5.44	2.82	3.17	6.00
Number of days to import	8.14	6.23	30.46	0.92	31.38
Quality of customs	3.21	3.22	2.54	1.83	4.36
Known amount of payments	3.42	3.47	2.71	2.43	5.14
Additional payments required	3.69	3.75	4.37	1.37	5.74
Recourse to another official	3.54	3.69	2.68	2.23	4.91

Some data on corruption variables as illustration: countries at various levels of quality

	One S.D. < Mean	Mean	One S.D. > Mean
Control of Corruption	Libya	Suriname	Oman
Corruption Perceptions Index	Bolivia, Cameroon, Ecuador, Haiti	Costa Rica, Jordan, Mauritius, South Korea	Ireland
Frequency of payments	Azerbaijan	Bulgaria	France
Number of days to import	Hungary	Armenia	Ecuador
Quality of customs	El Salvador	Romania	Ukraine
Known amount of payments	El Salvador	Armenia	Malaysia
Additional payments required	Colombia	Hungary	Belarus
Recourse to another official	Sweden	Canada	Lithuania

Table 1 Bilateral trade in 2002: corruption in general

	1	2	3	4	5
Log GDP importer	0.698***	0.725***	0.701***	0.726***	0.700***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Log GDP per capita importer	0.085***	0.100***	0.029	0.077***	0.146***
	(0.000)	(0.000)	(0.251)	(0.003)	(0.000)
Log GDP exporter	0.981***	1.008***	0.988***	1.010***	0.953***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Log GDP per capita exporter	0.059***	0.106***	-0.050*	0.076***	0.111***
	(0.000)	(0.000)	(0.090)	(0.012)	(0.000)
Distance	-0.209***	-0.185***	-0.209***	-0.185***	-0.188***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Common border		1.726***		1.732***	1.711***
		(0.000)		(0.000)	(0.000)
Common language		0.566***		0.557***	0.567***
		(0.000)		(0.000)	(0.000)
Common coloniser		1.326***		1.325***	1.382***
		(0.000)		(0.000)	(0.000)
Colonial link		0.718***		0.707***	0.802***
		(0.000)		(0.000)	(0.000)
Control of corruption					
. by importer			0.098***	0.038	
			(0.006)	(0.296)	
. by exporter			0.166***	0.045	
			(0.000)	(0.243)	
Log Corruption Perceptions Index					
. of importer					-0.209***
					(0.001)
. of exporter					-0.006
					(0.935)
Dummy log Corruption Perceptions Index					
. of importer					-0.168***
					(0.003)
. of exporter					-0.650***
					(0.000)
Adjusted R^2	0.59	0.61	0.59	0.61	0.62
N. of observations	12541	11813	12541	11813	11813
F-statistic	3555.31	2082.59	2548.57	1704.24	1469.91

Note: p-values are reported in parentheses in the line below the parameter estimates. Constant terms are not shown in the table. Standard errors are corrected for heteroscedasticity by White's procedure. ***: significant at the 99% confidence level **: significant at the 95% confidence level
*: significant at the 90% confidence level.

Table 2 Bilateral trade in 2002: corruption at the border, entire sample

	1	2	3	4	5
Log GDP	0.724***	0.723***	0.725***	0.727***	0.728***
importer	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Log GDP per capita	0.089***	0.078***	0.086***	0.077***	0.083***
importer	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Log GDP	1.008***	1.008***	1.008***	1.008***	1.008***
exporter	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Log GDP per capita	0.105***	0.106***	0.106***	0.106***	0.106***
exporter	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Distance	-0.185***	-0.184***	-0.185***	-0.184***	-0.185***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Common border	1.715***	1.720***	1.733***	1.710***	1.721***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Common language	0.566***	0.583***	0.555***	0.592***	0.561***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Common coloniser	1.339***	1.336***	1.330***	1.342***	1.341***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Colonial link	0.705***	0.669***	0.699***	0.683***	0.708***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.002)
Frequency of	0.091**			0.399*	0.327*
payments	(0.031)			(0.057)	(0.089)
Dummy frequency	-0.014			-0.041	-0.030
payments	(0.737)			(0.680)	(0.765)
Log number of		-0.138***		-0.970**	
days to import		(0.000)		(0.028)	
Dummy number of		-0.031		0.025	
days to import		(0.480)		(0.798)	
Quality of			-0.170***		-0.354**
customs			(0.001)		(0.016)
Dummy quality			-0.012		-0.027
customs			(0.770)		(0.783)
Log interaction				0.816*	
frequency & days				(0.057)	
Log interaction					-0.581
frequency & quality					(0.132)
Adjusted R^2	0.61	0.61	0.61	0.61	0.61
N. of observations	11813	11813	11813	11813	11813
F-statistic	1704.78	1706.97	1706.27	1341.50	1340.92

Note: p-values are reported in parentheses in the line below the parameter estimates. Constant terms are not shown in the table. Standard errors are corrected for heteroscedasticity by White's procedure. ***: significant at the 99% confidence level **: significant at the 95% confidence level
*: significant at the 90% confidence level.

Table 3 Bilateral trade in 2002: regressions with dummies for countries with (relatively) good or bad institutions

	1	2
Log GDP	0.716***	0.702***
importer	(0.000)	(0.000)
Log GDP per capita	-0.058	0.049
importer	(0.179)	(0.202)
Log GDP	1.037***	1.036***
exporter	(0.000)	(0.000)
Log GDP per capita	0.104***	0.103***
exporter	(0.000)	(0.1000)
Distance	-0.181***	-0.178***
	(0.000)	(0.000)
Common border	1.776***	1.783***
	(0.000)	(0.000)
Common language	0.758***	0.667***
	(0.000)	(0.000)
Common coloniser	0.943***	0.959***
	(0.000)	(0.000)
Colonial link	0.526***	0.596**
	(0.000)	(0.001)
Frequency of payments	0.515*	0.297
x dummy for good institutions	(0.107)	(0.302)
Frequency of payments	0.673**	0.308
x dummy for bad institutions	(0.033)	(0.198)
Log number of days to import	-0.808	
x dummy for good institutions	(0.187)	
Log number of days to import	-2.611***	
x dummy for bad institutions	(0.002)	
Quality of customs x dummy		0.109
for good institutions		(0.685)
Quality of customs x dummy		-0.264
for bad institutions		(0.195)
Log interaction frequency & days	0.539	
dummy for good institutions	(0.351)	
Log interaction frequency & days	1.743**	
x dummy for bad institutions	(0.019)	
Log interaction frequency & quality		0.024
x dummy for good institutions		(0.966)
Log interaction frequency & quality		0.594
x dummy for bad institutions		(0.264)
Adjusted R^2	0.63	0.63
N. of observations	5556	5556
F-statistic	626.28	621.66

Note: p-values are reported in parentheses in the line below the parameter estimates. Constant terms are not shown in the table. Standard errors are corrected for heteroscedasticity by White's procedure. ***: significant at the 99% confidence level **: significant at the 95% confidence level:
* significant at the 90% confidence level.

Table 4 Bilateral trade in 2002: the unpredictability of corruption, entire sample

	1	2	3	4
Log GDP	0.717***	0.721***	0.691***	0.718***
importer	(0.000)	(0.000)	(0.000)	(0.000)
Log GDP per capita	0.116***	0.110***	0.104***	0.102***
importer	(0.000)	(0.000)	(0.000)	(0.000)
Log GDP	1.009***	1.009***	1.009***	1.009***
exporter	(0.000)	(0.000)	(0.000)	(0.000)
Log GDP per capita	0.104***	0.104***	0.105***	0.105***
exporter	(0.000)	(0.000)	(0.000)	(0.000)
Distance	-0.187***	-0.188***	-0.186***	-0.186***
	(0.000)	(0.000)	(0.000)	(0.000)
Common border	1.688***	1.684***	1.713***	1.700***
	(0.000)	(0.000)	(0.000)	(0.000)
Common language	0.557***	0.557***	0.561***	0.562***
	(0.000)	(0.000)	(0.000)	(0.000)
Common coloniser	1.356***	1.360***	1.330***	1.353***
	(0.000)	(0.000)	(0.000)	(0.000)
Colonial link	0.767***	0.746***	0.736***	0.725***
	(0.000)	(0.000)	(0.000)	(0.000)
Known amount	-0.188***			
of payments	(0.000)			
Dummy known	-0.117***			
amount of payments	(0.004)			
Additional		-0.140***		
payments required		(0.000)		
Dummy of additional		-0.127***		
payments required		(0.002)		
Standard deviation			-0.055	
of the CPI			(0.330)	
Dummy of standard			-0.261***	
deviation of the CPI			(0.000)	
Recourse to				-0.112***
another official				(0.007)
Dummy of recourse				-0.122***
to another official				(0.002)
Adjusted R^2	0.61	0.61	0.61	0.61
N. of observations	11813	11813	11813	11813
F-statistic	1710.10	1710.70	1709.87	1707.45

Note: p-values are reported in parentheses in the line below the parameter estimates. Constant terms are not shown in the table. Standard errors are corrected for heteroscedasticity by White's procedure .***: significant at the 99% confidence level **: significant at the 95% confidence level
*: significant at the 90% confidence level.